

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte JOHN T. DELVIN and
GREG MONTANINO

Appeal No. 2006-0478
Application No. 09/651,498

ON BRIEF

Before OWENS, WALTZ, and JEFFREY T. SMITH, *Administrative Patent Judges*.

WALTZ, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal from the primary examiner's final rejection of claims 36, 39 through 42 and 44 through 46, which are the only claims pending in this application. We have jurisdiction pursuant to 35 U.S.C. § 134.

According to appellants, the invention is directed to a rotary spindle assembly for production of semiconductor wafers where a wafer is coated or otherwise processed while supported on a rotatable wafer support with specialized temperature control to improve wafer processing uniformity and accuracy (Brief, page 2).

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Further details of the temperature control features are found in representative independent claim 36, reproduced below:

36. A rotary spindle assembly comprising a rotary drive motor, a rotary spindle, a wafer support, a wafer processing bowl, a heat regulating flange, and a heat regulating element, wherein:

said wafer support is secured to said rotary spindle so as to be rotatable with said spindle;

said rotary spindle defines a lower spindle area and an upper spindle area;

said rotary spindle is mechanically coupled to said rotary drive motor in said lower spindle area;

said heat regulating flange is positioned in said lower spindle area;

said heat regulating element is positioned in said upper spindle area between said heat regulating flange and said wafer support such that a fluid conduit disposed in said heat regulating element and configured to transport a thermal control fluid therethrough defines a substantially cylindrical heat regulation void about a portion of said rotary spindle in said upper spindle area, said heat regulation void thermally coupled to said fluid conduit such that upon passage of a fluid through said fluid conduit and exhaust gases through said heat regulation void, an exchange of heat occurs therebetween; and

said heat regulating element defines an open framework arranged about said rotary spindle such that upper and lower ends of said heat regulating element are open to said substantially cylindrical heat regulation void from said lower spindle area to said upper spindle area.

Appellants state that the claims do not stand or fall together, and present specific, substantive arguments for the separate patentability of claims 36, 44 and 39 (Brief, page 3). Accordingly, pursuant to 37 CFR § 1.192(c)(7)(2003), now 37 CFR § 41.37(vii)(2004), we consider these claims separately. See also

In re McDaniel, 293 F.3d 1379, 1383, 63 USPQ2d 1462, 1465 (Fed. Cir. 2002).

The examiner has relied upon the following references as evidence of obviousness:

Kimura	5,578,127	Nov. 26, 1996
Sugimoto et al. (Sugimoto)	5,762,709	Jun. 09, 1998
Hayes	6,107,608	Aug. 22, 2000

Claims 36 and 44-46 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Sugimoto in view of Kimura (Answer, page 3). Claims 39-42 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Sugimoto in view of Kimura and Hayes (Answer, page 4).

We affirm the rejections of claims 36, 39-42 and 44-46 on appeal essentially for the reasons stated in the Answer, as well as those reasons set forth below.

OPINION

The examiner finds that Sugimoto discloses a spin coating apparatus with a heat regulating element (Figure 2, #50), a cylindrical heat regulation void to accommodate an object (Fig. 2, #1a), a circumferential gas flow path (Fig. 2, #30), a temperature sensor in the gas flow path (Fig. 3, #58a [sic, # 58b]), a rotary drive motor and rotary drive spindle (Fig. 2, # 1b and 1[sic,

#1a]), an exhaust gas profile (Fig. 5, F), and a wafer support (Fig. 2, W) (Answer, page 3).

The examiner recognizes that Sugimoto does not disclose a regulating frame with fluid inlet and outlet and an additional heat-regulating flange attached to the drive motor (*id.*). Therefore, the examiner cites Kimura for the disclosure of a heat regulating flange (Fig. 2, #31b), a rotary drive motor (Fig. 2, #31) attached to a rotary spindle extending through the flange body (Fig. 2, #31a), a liquid source coupled to the fluid conduit (Fig. 2, #33), a controller coupled to the liquid source (Fig. 2, #36), programmed to be responsive to a signal from a temperature sensor proximate the rotary spindle passage and fluid conduit so as to control the temperature of the flange by controlling the temperature of the fluid (Answer, pages 3-4).

From these findings, the examiner concludes that it would have been obvious to one of ordinary skill in this art at the time of appellants' invention to have a heat regulation flange, as disclosed in Figure 2 of Kimura, to prevent heat conduction from the motor to the wafer in Sugimoto (Answer, page 4). We agree.

Appellants argue that there is neither a suggestion nor a teaching of the claimed "open framework" heat regulating element (Brief, pages 4 and 6). Appellants argue that their use of the

term "open framework" is meant to convey the substantially unobstructed exhaust gas flow path of the heat regulation void within the heat regulating element (Reply Brief, page 3).

Appellants further argue that the airflow mechanism of Sugimoto teaches a closed configuration, as evidenced by the air supply conduit 30 and damper 40 shown in Figure 2 in conjunction with frequent description of the small nature of the conduit openings (Brief, page 4, citing col. 5, ll. 39-43; page 6).

Appellants' arguments are not persuasive. During prosecution before the examiner, the claimed words should be given the broadest reasonable meaning in their ordinary usage as understood by one of ordinary skill in the art, taking into account any guidelines or definitions found in the original disclosure. See *In re Morris*, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). Sugimoto discloses a rotary drive motor (electric motor 1b in Figure 2); a rotary spindle coupled to said motor (hollow rotary shaft 1a); and a heat regulating element (air flow adjusting unit 50 in conjunction with the air flow path defined around the spindle) with a fluid inlet, a fluid outlet and a fluid conduit extending from said inlet to said outlet. Although the claimed word "fluid" is exemplified as a liquid in appellants' specification (page 9, second full paragraph), this word in its

ordinary usage may include both liquids and gases.¹ Therefore a fluid inlet is disclosed by Sugimoto at 30a in Figure 2 (the air supply conduit inlet), with at least a fluid outlet at the top of the spindle (see 20 in Figure 2 and F in Figure 5), and a fluid conduit connecting the inlet and outlet (the air supply conduit 30).

Sugimoto also discloses a fluid source coupled to said fluid conduit (air flow adjusting unit 50), a substantially cylindrical heat regulation void (the space around the spindle, including the "small opening" 30b); a temperature sensor (col. 6, ll. 3-4); where there must be a "heat regulation void" with an inside diameter selected to accommodate the outside diameter of said rotary spindle and an exit gas flow path at 30b (see Figures 2 and 5); and finally the heat regulating element is defined by an "open framework" such that the upper and lower ends of the heat regulating element are open to said void. Appellants and the examiner apparently agree that the claimed term "open framework" should be construed as including gaps between the spindle and frame with a side opening, with the frame containing a cylindrical cut-out through its body

¹See *Hackh's Chemical Dictionary*, pp. 346-47, (Grant, ed., The Blakiston Co., Inc., 1953). A copy of this definition may be found in an attachment to the decision in related Appeal No. 2005-0874, Application No. 10/320,073, mailed Mar. 31, 2005 (see the Brief, page 1, ¶(2)).

(Answer, page 5; Reply Brief, page 3; and the specification, page 11, ll. 20-27). As previously discussed, Sugimoto discloses a heat regulating element with a gap between the spindle and the frame (see 30b in Figure 2 adjacent to the lower spindle, as well as the void around the upper spindle; see also Figure 5), as well as the side opening 30a in Figure 2. Accordingly, we agree with the examiner that Sugimoto discloses at least as much openness as the claimed open framework, as we have construed this term above. We also note that the dimensions of the "void" in Sugimoto are such that exhaust gases are *capable* of flowing from said lower spindle (at 30b) through the upper spindle area (see Figure 5). See *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) ("Schreiber's contention that his structure will be used to dispense popcorn does not have patentable weight if the structure is already known").

Appellants argue that Sugimoto discloses a closed configuration, as evidenced by air supply conduit 30, damper 40 and the "small" nature of the conduit openings (Brief, pages 4 and 6). This argument is not persuasive. The air supply conduit inlet 30a of Sugimoto is not evidence of a closed system since it is identical to or similar to appellants' side entry gas intake port 53 (see Figure 4). Similarly, the "small nature" of the conduit

openings has not been shown by appellants to evince a "closed" system. The damper 40 of Sugimoto is used to adjust the velocity and quantity of air flow F (col. 5, ll. 45-47). However, appellants have not established that use of a damper requires a "closed" system, especially in view of the other openings disclosed by Sugimoto. See *In re Scarborough*, 500 F.2d 560, 566, 182 USPQ 298, 302 (CCPA 1974) (generally held that attorney argument is insufficient to take the place of evidence or expert testimony).

Appellants argue that Sugimoto and Kimura are "silent as to using a heat exchange arrangement between the flowing air and a heat regulating fluid disposed in conduit around that spindle" (Brief, page 5). This argument is not well taken since the claims, as written, are directed to apparatus and thus the prior art need only disclose apparatus *capable* of arranging heat exchange between fluids to be a proper reference under §§ 102 or 103. See *In re Schreiber, supra*.

The examiner finds that Kimura discloses use of a heat regulation flange, as required by the claims on appeal, and teaches use of this flange to prevent heat conduction from the motor to the wafer in a rotary spin coating apparatus (Answer, pages 3-4). From this finding and the findings from Sugimoto, the examiner concludes that it would have been obvious to one of ordinary skill in this

art to use a heat regulation flange with the apparatus of Sugimoto for the benefit taught by Kimura (Answer, page 4).

With regard to the rejection of claim 44, appellants argue that the heat regulating element additionally recites a frame to which the fluid conduit is coupled (Brief, page 7). Appellants argue that the examiner has ignored this limitation (*id.*). Appellants further argue the positioning of the flange element (Brief, page 8).

These arguments are not well taken. Sugimoto discloses a frame around the rotary spindle with the fluid conduit coupled thereto and defining a heat regulation void 30b (see the crosshatched frame (unnumbered) in Figures 2 and 5). The positioning of the heat regulating flange of Kimura would have been obvious, for reasons discussed in detail in the decision in related Application No. 10/320,073 (pages 9-10).


With regard to the rejection of claim 39 on appeal over Sugimoto, Kimura and Hayes, appellants argue that positioning a temperature sensor within the chuck, as in Hayes, is not the same as the claimed positioning of the temperature sensor in the heat regulating flange (Brief, page 9). Appellants' argument is not persuasive. Hayes teaches a temperature sensor 38 embedded within a heat transfer device 345, not the chuck, where the heat transfer

device is positioned between a spin motor 16 and the wafer support surface 24 (see Figure 7). Accordingly, since both Sugimoto and Kimura teach the need for temperature sensors and temperature control (Answer, page 4), the positioning of a temperature sensor in or close to any heat transfer device would have been well within the ordinary skill on one in this art, as taught by Hayes.

For the foregoing reasons and those stated in the Answer, we determine that the examiner has established a prima facie case of obviousness in view of the reference evidence. Based on the totality of the record, including due consideration of appellants' arguments, we determine that the preponderance of evidence weighs most heavily in favor of obviousness within the meaning of § 103(a). Therefore, we affirm the rejection of claims 36 and 44-46 under § 103(a) over Sugimoto in view of Kimura, as well as the rejection of claims 39-42 under § 103(a) over Sugimoto, Kimura and Hayes.

The decision of the examiner is affirmed.

AFFIRMED


JEFFREY T. SMITH
Administrative Patent Judge

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